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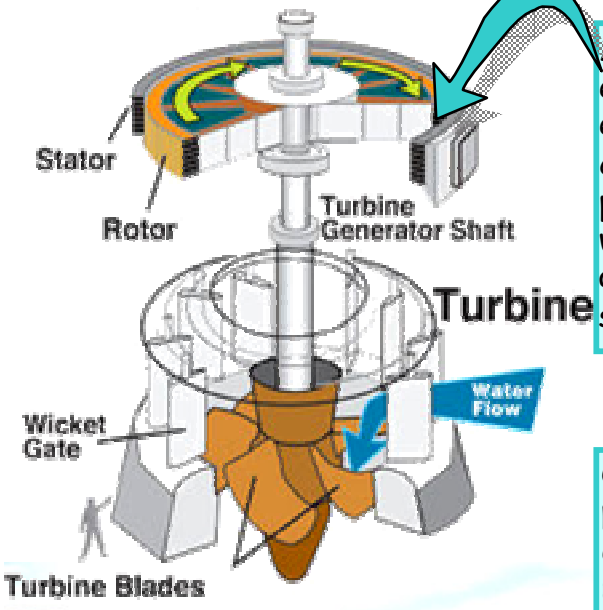
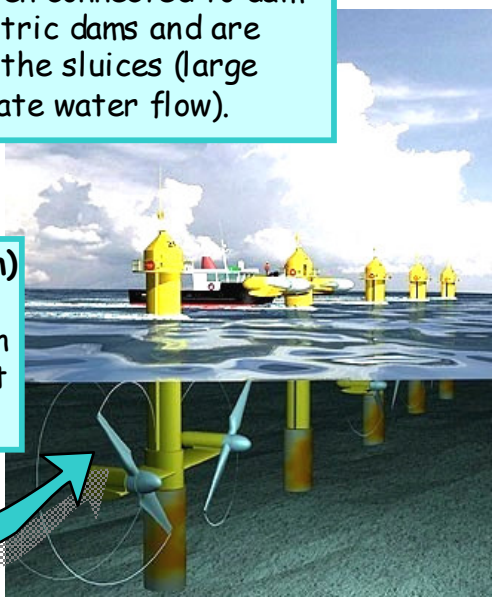
Water Energy

Water energy is the conversion of the energy from **moving water** into mechanical energy or electricity. Since water is about a thousand times **denser** than **air**, even a slow flowing stream of water or moderate sea waves, can yield **large amounts of energy**. Mechanical energy is derived by directing, harnessing, or channeling moving water. Water energy can be harnessed from:

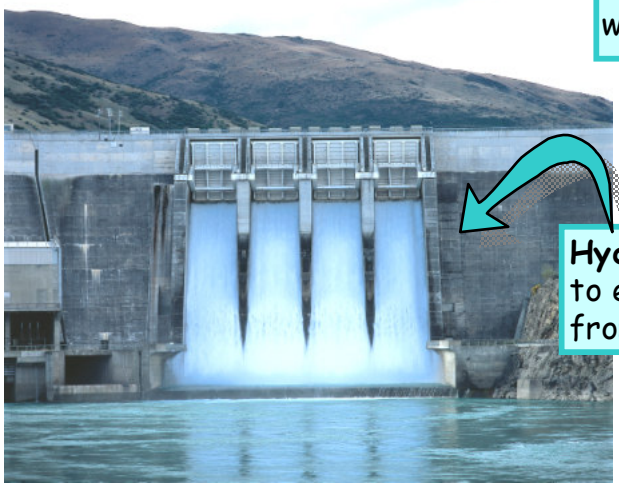
- **Flowing rivers**: using hydro power stations of various sizes
- **Ocean currents**: the "underwater rivers" in the world's oceans
- **Ocean tides**: the regular high and low tides along the coast caused by the moon
- **Ocean waves**: the regular up and down of waves



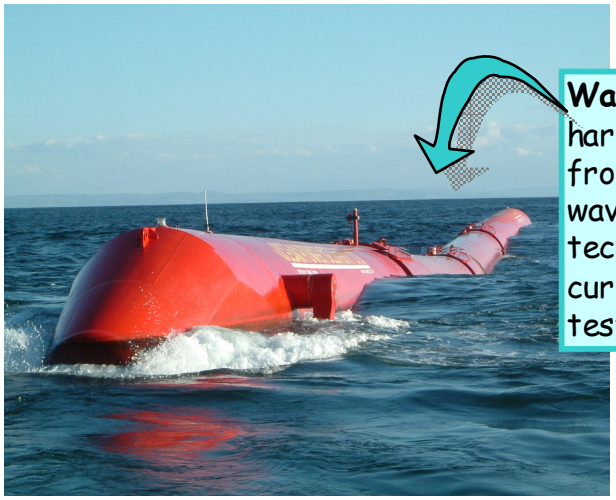
A **water turbine** is a rotary engine used for electric power generation. The turbine takes energy from moving water and is the most common technology for harnessing hydro power. Turbines are often connected to dam walls of large hydroelectric dams and are activated when opening the sluices (large sliding gates that regulate water flow).



Ocean current (stream) power generators draw energy from currents in much the same way that wind generators do.



Hydroelectricity refers to electricity derived from hydroelectric dams.



Wave energy is the harnessing of power from the ocean's waves. Different technologies are currently being tested.

The **waterwheel** is an ancient device that uses flowing or falling water. Water moves the wheel, which then turns a electricity generator or wheels and cogs in mechanical devices.

Tidal power converts energy from the daily high and low tides. A wall, with integrated turbines, is constructed across the opening of a narrow bay. As the tide flows in and out the turbines turn.

Hydroelectric power stations are the most common form of capturing water energy and many countries have constructed dams into rivers, in order to regulate their flow and this way generate electricity on demand. Hydro power stations are distinguished according to their size of power generation:

Large- hydro	More than 100 MW and usually feeding into a large electricity grid
Medium-hydro	15 - 100 MW - usually feeding a grid
Small-hydro	1 - 15 MW - usually feeding into a grid
Mini-hydro	Above 100 kW, but below 1 MW; either stand alone schemes or more often feeding into the grid
Micro-hydro	From 5kW up to 100 kW; usually provided power for a small community or rural industry in remote areas away from the grid.
Pico-hydro	From a few hundred watts up to 5kW

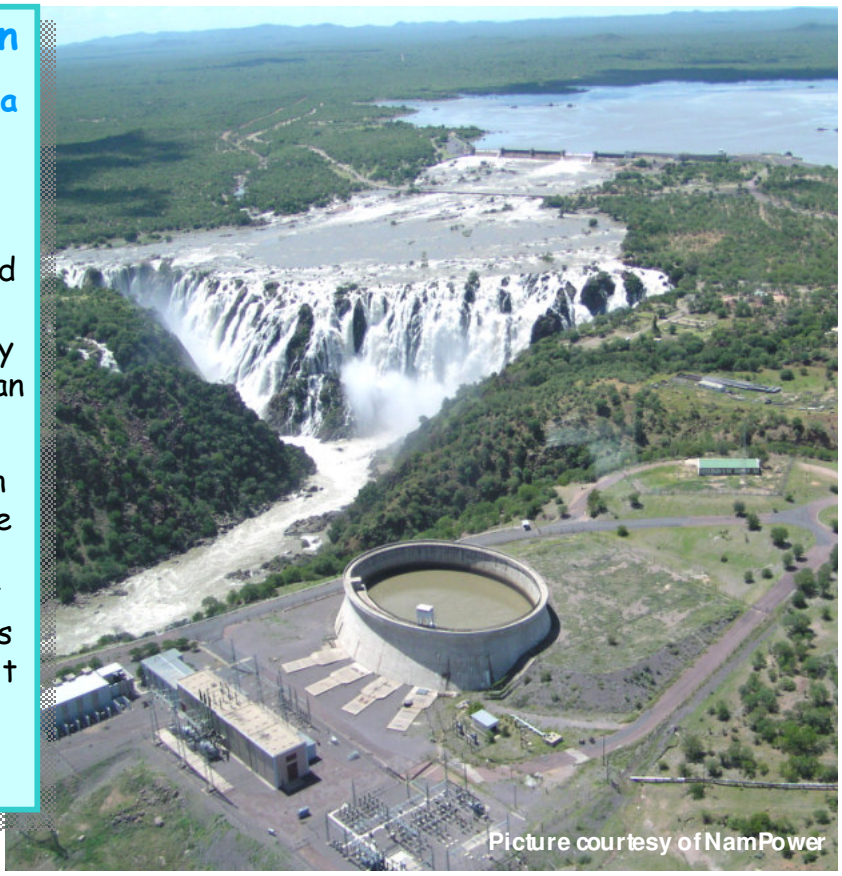
kW (kilowatt) - 1000 Watts; MW (megawatt) - 1 000 000 Watts or 1000 kW

Ruacana Hydro Power Station

Ruacana Falls, Kunene River, Namibia

After a 5 year construction period the Ruacana Hydro Power Station was commissioned in 1978. Namibia draws most of the electrical energy generated in Namibia from the Ruacana power station, which has a generation capacity of **240 MW** and feeds into the Namibian electricity grid at **330 000 Volts**.

The Ruacana Hydro Power Station is an underground hydroelectric scheme. The station is supplied with water into a water storage reservoir, from where it drops almost 134m down vertical shafts into the heart of the mountain, where it drives three turbines before rejoining the Kunene River through a tunnel that exits near the Hippo Pool.


Picture courtesy of NamPower

Additional Information

http://en.wikipedia.org/wiki/Hydro_power

http://www.originenergy.com.au

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